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Entrepreneurial Behavior During Industry Emergence: An Unconventional Study of Discovery and Creation in the Early PC Industry

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Acting entrepreneurially in nascent industries is a complex endeavor characterized by uncertainty and ambiguity. Nevertheless, entirely new industries do emerge, often as a direct result of entrepreneurial behavior. We extend and apply discovery and creation approaches to study entrepreneurial behavior during industry emergence by means of qualitative analysis of a film about the personal computer (PC) industry's formative years. We find that discovery and creation behavior are fundamentally interrelated and share a common element: bricolage. Moreover, ideological activism is a major component of entrepreneurial behavior in a new industry's formative years during both creation and discovery processes. Implications for research and practice are discussed.

Keywords: entrepreneurial behavior, discovery, creation, qualitative methodology

Entrepreneurial behavior is "risky business" under any condition, but especially during an industry's formative years when there are few precedents for the kinds of activities in which enterprising actors want to engage (Sine, Haveman, & Tolbert, 2005). Nevertheless, entirely new industries emerge successfully, often as a direct result of human agency (Garud & Karnoe, 2003). Studies of entrepreneurial behavior have tended to concentrate on relatively mature industries where its dynamics may differ (Mezias & Kuperman, 2001), resulting in "the persistence of major gaps in our understanding" of the phenomenon (Forbes & Kirsch, 2011). This lack of studies on entrepreneurial behavior in emergent industries is a notable omission. Not only is entrepreneurial behavior an important research topic in its own right, but events and activities during this time also tend to have a profound impact on an industry's subsequent development (Aldrich & Reuf, 2006). In our study, we begin to redress this research gap. We extend prior research and empirically apply discovery and creation perspectives to study entrepreneurial behavior during industry emergence through a narrative analysis of a 1999 made-for-TV film, *Pirates of Silicon Valley* (henceforth *PSV*), which documents the activities of a variety of actors involved in the emergence of the personal computer (PC) industry (Leonard, 1999).

At present, the literature presents two perspectives—discovery and creation—that explicitly address the role of agency and action in entrepreneurship (Alvarez & Barney, 2007). For discovery theorists, alert actors identify hitherto unperceived discrepancies that can be readily rectified (Kirzner, 1997; Shane, 2003). For creation theorists, imaginative actors create new artifacts (Mathews, 2010; Sarasvathy, 2001). In metaphorical terms, discovery is about "searching the brushy woods for a choice of path," while creation involves constructing new paths (Hjorth & Johannisson, 2008: 343). For the most part, these two theoretical perspectives have been considered opposed to each other in the prior literature. Despite the increasing popularity of discovery and creation approaches in entrepreneurship (Edelman & Yli-Renko, 2010; Vaghely & Julien, 2010), these two perspectives have not been explicitly used to provide insights into entrepreneurial behavior in emergent industry contexts (Bird & Schjoedt, 2009). We therefore apply these perspectives, with the goal of comparing and contrasting them to advance our understanding of entrepreneurial behavior under conditions of uncertainty and ambiguity (Alvarez & Barney, 2010).

The film *PSV* is based on careful research that involved digging through "reams of documents dating back to the 1970s," reading "all available books about those involved" in the process, combing through old magazine pieces written as events were unfolding, and viewing "miles of film and video footage" related to the main characters (Huff, 1999). Steve Wozniak, a key figure in the development of Silicon Valley and a co-founder of Apple Inc., provided an industry insider endorsement of the film (Korsgaard & Neergaard, 2011) when he declared that it "pretty much reflected the events as they happened" (Wozniak, 2000). This is not to say that

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PSV, like other entrepreneurship stories, may not take some artistic license, substituting—in Gartner's words (2007: 614)—"unknowns in the knowledge of specific 'facts as given' with 'facts as made.'" It nevertheless serves as a rich source of information to generate insights into entrepreneurial behavior (Gartner, 2010a). Ahl and Czarniawska (2010: 196) argue that even if an entrepreneurship story is not completely authentic, it can still advance the study of entrepreneurial behavior as long as "it is interesting to analyze."

In the present study, we deploy discovery and creation theories to cast new light on industry emergence using *PSV* as a key source of information about the formative years of the PC industry. We advance knowledge about entrepreneurial behavior during industry emergence in several ways. First, the discovery and creation perspectives that we employ not only allow us to examine and apply theoretical tenets from existing perspectives, but also to develop theoretically grounded insights into entrepreneurial behavior in an emergent industry context (Aldrich & Reuf, 2006). Forbes and Kirsch (2011: 4) contend that industry emergence represents the "left side of a story whose center and right are comparatively well documented" in the organizational literature. Our use of two established theoretical frameworks—discovery and creation—seeks to shed new light on entrepreneurial behavior in a nascent industry context.

Second, we use a qualitative approach to provide a context-rich empirical analysis of entrepreneurial behavior (Gartner, 2010a; Hjorth, Jones, & Gartner, 2008). Our approach involves a holistic interpretation of the recorded activities and processes comprising entrepreneurial behavior (Phillips & Brown, 1993), which makes this approach suitable for research in entrepreneurship (Chiles, Vultee, Gupta, Greening & Tuggle, 2010a). Although researchers have long viewed qualitative research with indifference, skepticism, and even disdain, it is gradually gaining respectability in entrepreneurship and is expected to become more prominent (Gartner, 2007), so that some scholars now consider such research crucial for knowledge generation in entrepreneurship (Gartner, 2010b; Steyaert, 2007). The detail, drama, and surprise that characterize qualitative studies provide contextualization and intensity of experience that entrepreneurship researchers believe helps theory development in their field (Fletcher, 2007; Hjorth & Johannisson, 2008; Teague, 2010).

Third, although stories about entrepreneurial behavior abound in contemporary society (Fletcher, 2007), such stories have traditionally been ignored in entrepreneurship scholarship (Ahl & Czarniawska, 2010). This neglect has begun to change in recent years with scholars beginning to appreciate the value of entrepreneurship stories in biographical accounts (e.g., *The Toy Stor(e)y* in Gartner, 2007) and books (e.g., *Republic of Tea* in Gartner, 2010b). Despite this increase in the use of "stories as data" (Gartner, 2010a), films have not yet entered the repertoire of scholars in our field. This is surprising, because film presents a story as a "sequence of events connected by subject matter and related by time" (Scholes, 1980: 209). In addition, films are important cultural and educational artifacts, and have a "pervasive and enduring presence" in modern society (Neuendorf et al., 2010: 759). Our use of a film that is readily available for future study thus has the potential to extend story-based entrepreneurship research (e.g., Gartner, 2007, 2010b) in new directions (Gartner, 2010a).

Theoretical Background

Discovery and Creation Perspectives

Discovery and creation frameworks can be considered meta-perspectives comprising a wide variety of entrepreneurship research based on underlying philosophical assumptions (Chiles et al., 2010a; Zahra, 2008). Although both perspectives are rooted in fundamentally different assumptions about the nature of the market process (Gloria-Palermo, 1999), they embrace the idea that the economy is driven by enterprising actors' spontaneous actions (O'Driscoll & Rizzo, 1985). The discovery perspective assumes a realist objective ontology, whereas the creation perspective is rooted in subjective constructivist ontology (Pacheco, Dean, & Payne, 2010). The former posits that the world is comprised of objective phenomena to which entrepreneurs respond actively (Kirzner, 1997; Shane & Venkataraman, 2000), while the latter contends that entrepreneurial action continually constructs the world (Chiles, Tuggle, McMullen, Bierman & Greening, 2010b). In contemporary entrepreneurship research, discovery is associated with the work of, for example, Shane (2000) and Busenitz (1996); creation is associated with entrepreneurship in the work of Sarasvathy (2001) and Chiles and Zarankin (2005).

In recent years, discovery and creation have emerged as credible alternatives to traditional neoclassical models that provided a limited—if any—role for entrepreneurial behavior in the economy (Klein, 2008). Both the discovery and creation approaches spotlight entrepreneurs as enterprising agents who introduce new products and services to the world (Zahra, 2008), and celebrate entrepreneurial behavior as an engine for economic development (Miller, 2007). Table 1 presents a summary comparison of the two perspectives as they pertain to entrepreneurship.

Table 1. Comparing Discovery and Creation Approaches

Key Elements	Discovery Approach	Creation Approach
Philosophical Paradigm	Objective realist ontology	Subjective constructivist ontology
Key Entrepreneurial Facility	Alertness	Imagination
Position on Agency	Formulaic	Bricolage
View of Opportunity	Objective, hidden: waiting to be discovered	Enacted, constructed: created through action
Locus of Subjectivity	Knowledge based on previous experience	Conjecture based on future expectations
Source of Change	Exogenous shocks	Endogenous, by entrepreneurs in an evolutionary, path-dependent manner
Nature of Planning	Causation	Effectuation
Market System	Equilibrating	Disequilibrating
Nature of Evolution	Path dependence	Path creation
Decision-making Setting	Risky	Uncertain
Representative Authors	Busenitz (1996); Shane (2000); Gaglio and Katz (2001)	Baker and Nelson (2005); Chiles, Bluedorn, and Gupta (2007); Sarasvathy (2001)

As can be seen in Table 1, a key aspect of the discovery approach is alertness, whereas in the creation approach the focus is on imagination. The former involves scanning the environment to identify pre-existing means-end asymmetries (Sarasvathy, Dew, Velamuri, & Venkataraman, 2003), while the latter involves bringing into being new means and/or ends (Buchanan & Vanberg, 1991). From a discovery perspective, action is based on the interpretation of past experiences (Shane, 2000) while, from a creation lens, action is driven by expectations about an unknown future (Chiles et al, 2010b). In the discovery view, change occurs as a result of exogenous "shocks" beyond one's control, while in the creation view change is brought about by purposeful acts (Vaughn, 1992). Discovery theorists encourage entrepreneurs to identify and analyze alternatives selecting one with highest expected returns (Fiet, 1996), whereas creation theorists advocate gradual commitments and experimentation (Sarasvathy, 2001). The former emphasizes formulaic agency (combining things in a predetermined manner), while the latter brings bricolage (making do with resources at hand) center-stage. In discovery, entrepreneurship is path-dependent ("where one can be depends on where one has been"), and in creation it is path-generative ("where one can be depends on where one wants to be") (Garud & Karnoe, 2003).

To date, theoretical and empirical research on discovery and creation has largely centered on the opportunity concept (e.g., Zahra, 2008; Sarasvathy, Dew, Velamuri, & Venkatarman, 2003). Entrepreneurship scholars have used discovery and creation to examine business opportunities in Canadian small- and medium-sized enterprises (Vaghely & Julien, 2010), Swedish mobile Internet entrepreneurs (Berglund, 2007), and small ventures in the US (Edelman & Yli-Renko, 2010). While such studies have taught us much about the nature of business opportunities, they do not go far enough to explore the broader domain of entrepreneurial behavior. This is an important shortcoming in prior research, since it is possible that when it comes to entrepreneurial behavior, discovery and creation operate differently than in the realm of opportunity. We advance Alvarez and Barney's (2007) initial attempt to extend the scope of discovery and creation perspectives. Specifically, we examine and apply discovery and creation in the realm of entrepreneurial behavior, moving beyond their limited application to business opportunity. A number of researchers in entrepreneurship and organizational studies have noted that discovery and creation theories offer distinct insights into entrepreneurship phenomenon (Santos & Eisenhardt, 2009; Kor, Mahoney, & Michael, 2007; Pacheco, Dean, & Payne, 2010; Vaghely & Julien, 2010).

Entrepreneurial Behavior in Emergent Industries

Although some may argue otherwise, it seems evident that much of what we consider entrepreneurship involves intentional entrepreneurial behavior (Krueger, O'Reilly, & Carsrud, 2000). Defined broadly, entrepreneurial behavior encompasses activities and events that enterprising actors enact to pursue an entrepreneurial path (Bird & Schjoedt, 2009). By definition, behavior is concrete, not abstract, and can be seen and/or heard.

An example of such concrete behavior is found in the short story, *A Toy Store(y),* which is a retrospective account of a toy retailing endeavor and recently the centerpiece of a special journal issue on narrative research in entrepreneurship (Allen, 2007). In this engaging business story, an enterprising team starts a venture selling toys, confronts several obstacles in the process, and cashes out after some weeks (Fletcher, 2007). The story describes the various activities and milestones such as taking out loans, leasing commercial space, obtaining merchandise, running promotions, acquiring customers, and outsmarting competitors (Allen, 2007). When interpreted and understood in the context of the story as a whole, these actions provide rich insights into the concept of entrepreneurial behavior (Gartner, 2007). Together, these activities, each of which can be broken down into its constituent elements (e.g., taking out a loan involves meeting with a banker, completing an application, etc.), constitute the entrepreneurial process.

It is a truism that entrepreneurial behavior is risky (Sine, Haveman, & Tolbert, 2005). In emerging industries, the level of risk is exacerbated as the public and resource providers are unfamiliar with and skeptical about new market offerings (Sarasvathy, 2001). Nevertheless, in the past few decades, various new industries (e.g., the PC industry) have emerged, providing employment, producing wealth, and fostering economic development (Garud & Karone, 2003). The successful emergence of new industries is remarkable, considering that many nascent industries never manage to emerge, remain dormant for decades, or meet a conclusive death at some point. (Forbes & Kirsch, 2011). Despite disagreements about the precise temporal boundaries of industry emergence, there is a general consensus that emergence refers to a new industry's formative years, concluding with maturity or stability (Aldrich and Reuf, 2006). In terms of time, it may take a new industry anywhere from one or two years to more than fifty to get to a stage where its dominant logic is widely accepted (Klepper & Graddy, 1990), at which point it is considered an established industry (Mezias & Kuperman, 2001).

Ambiguity—defined as a "lack of clarity about the meaning and implications of particular events or situations" due to unknown patterns of relationships and actions (Santos & Eisenhardt, 2009: 644)—is a characteristic feature of emergent industries. Ambiguity in emerging industries can be contrasted with the inability to predict the probability of specific outcomes in established industries that have a widely accepted dominant logic (Sarasvathy, Dew, Velamuri, & Venkataraman, 2003). Specifically, emerging industries offer fertile ground for entrepreneurial action, as enterprising actors test new ideas that are retained, discarded, or refined, depending on market responses (Sine & Lee, 2009).

The undefined structure and multiple possible cause-effect relationships characterizing emerging industries facilitate new interpretations that reduce their inherent ambiguity (Santos & Eisenhardt, 2009). Weick (1995: 95) argues that there are two possible responses to ambiguity: "Ambiguity understood as confusion created by multiple meanings calls for … construction [and] ambiguity understood as ignorance created by insufficient information calls for … discovery." Building on this insight, we suggest that insights into entrepreneurial behavior during industry emergence may emerge from discovery and creation perspectives (Alvarez & Barney, 2007; 2010).

More than four decades ago, Baumol (1968: 66) observed that the entrepreneurial actor—"the Prince of Denmark"—is absent "from the discussion of *Hamlet*." Twenty years later, Low and Macmillan's (1988) seminal article urged researchers to study entrepreneurial behavior on the part of enterprising actors to understand and explain entrepreneurship. This new focus posed certain challenges: entrepreneurial behavior tends to be idiosyncratic, rare, and unpredictable (Macmillan & Katz, 1992), making it difficult to conceptualize and study empirically. Indeed, in their recent review of the extant literature on entrepreneurial behavior published twenty years after Low and Macmillan (1988), Bird and Schjoedt (2009: 334) observed "a paucity of empirical research and a lack of conceptual clarity" in the area. Thus, despite its value as a "fertile and unique intellectual space" (Low, 2001: 22), scholarly understanding of entrepreneurial behavior in emergent industries remains limited (Krueger, Reilly, & Carsrud, 2000). We hold that the application of well-developed theoretical frameworks such as discovery and creation would be helpful in overcoming this problem.

We note that the present study is located in the growing research stream illuminating entrepreneurial behavior during a new industry's formative years (Forbes & Kirsch, 2011). Aldrich and Fiol (1994: 645)

observed that during the early years, entrepreneurial behavior involves navigating "at best, an institutional vacuum of indifferent munificence" and, at worst, "a hostile environment impervious to [entrepreneurial] action." Despite these challenges, substantial entrepreneurial activity does occur in nascent industries (Forbes & Kirsch, 2011). Event-driven methods are required to capture the salient features of behavior that unfolds over time during industry emergence (Van de Ven & Engelman, 2004). Such methods employ narrative explanations to address how rare and unpredictable events—in this case, acts of entrepreneurial behavior—occur, and then relate these specific activities to the big picture (Chiles et al., 2010a). The methodological approach we use emphasizes the need to interpret specific events in the broader context in which they occur, and to understand the larger picture by making sense of the individual events (Klein & Myers, 1999). Our study thus facilitates a new understanding of entrepreneurial behavior by conducting a qualitative analysis, which can be employed to study historical events in a variety of contexts (Mumford, 2002).

Method

Data

The data for our study was derived from the film *Pirates of Silicon Valley* (*PSV*), which documents the emergence of the PC industry. A film is a "vivid text" that unfolds over time (Valdez & Halley, 1999). Rudy, Popova, and Linz (2010) argue that films occupy an important position in contemporary society because they reflect social norms and conventions, as well as socialize people by communicating ideas about what is (or is not) acceptable in a particular society. Scholars studying the sociology of knowledge consider films to be very useful in establishing and maintaining norms, values, and beliefs in society (Freeman & Valentine, 2004). Thus, films constitute "an important cultural text," especially in "a predominately visual culture, in which films are often watched far more readily" than other texts are consumed (Jasper, 2004: 128). Yet, as Neuendorf and others (2010: 759) note, "films are a body of media content that is often overlooked" by business organizational researchers. This is especially true in entrepreneurship research, where films remain unexplored as a data source for textual analysis (Gartner, 2010b).

PSV has several characteristics that make it suitable for this research (Eisenhardt & Graebner, 2007). First, the film develops complex arguments, going beyond the usual storybook template of entrepreneurship stories. This atypicality lends credibility and authenticity to the story presented in the film, making it worthy of study (Ahl & Czarniawska, 2010). Second, *PSV* presents an account of events during the PC industry's emergence that unfold over several years, linking antecedents to consequences through actions, and in specific contexts (Lunce & Smith, 2005). It creates a meaningful account of industry emergence from disparate activities linking the industry's fragmented, messy, and non-linear history into a coherent whole (Fletcher, 2007), describing how the industry came about, and the problems and opportunities encountered along the way (Fletcher, 2007). Third, the film offers several well-researched entrepreneurial episodes that can be supplemented with additional research (Mumford, 2002). Although the story told in *PSV* is a retrospective account by Steve Wozniak (the co-founder of Apple) and Paul Allen (the co-founder of Microsoft), several notable individuals (e.g., Ed Roberts, Bill Gates, Steve Jobs, and Mike Marakula) and organizations (e.g., Xerox and IBM) that each played an important part in the nascent PC industry are also introduced, seen, and heard in the film.

Research Methodology and Analysis

Our methodological approach involved the identification of episodes of entrepreneurial behavior that could be analyzed to develop theoretical insights (Mumford, 2002). We (i.e., research team of two scientists and two research assistants) watched the film attentively (several times in full and in parts) to identify such episodes. Taking the theoretical tenets of discovery and creation into consideration (see Table 1), we deliberately selected episodes of entrepreneurial behavior that, in our view, illustrate the two theoretical frameworks dicussed above (Diesing, 1991). Our approach was consistent with theory-based sampling, which selects examples for their potential to manifest or elucidate chosen concepts (Neergaard, 2007). An initial intercoder reliably of 90% was achieved among the four team members before the eventual collection of entrepreneurial episodes was approved. These episodes covered a variety of entrepreneurial behaviors across a range of contexts and situations. Since all the selected episodes occurred over a specific time-span (the early 1970s to the mid-1980s) in a specific cultural setting (the US), our approach implicitly controlled for historical and cultural factors (Eisenhardt, 1989).

We identified five exemplary episodes each of discovery and creation. Some qualitative researchers have noted that understanding evolves when one moves "from the whole to the part and back to the whole" (Myers, 2009: 191). This suggests that the more cases a researcher examines and the more information obtained about each case, the better the

understanding of the entrepreneurial phenomenon and its various aspects (Gartner, 2007). Neergaard (2007) compared such research to a jigsaw puzzle: by putting individual pieces together, a more holistic picture emerges. However, there are no decisive guidelines about how many episodes are needed to provide a complete understanding of any phenomenon. Eisenhardt and Bourgeois (1988) use four firms in their study of the microcomputer industry, while Mumford and van Doorn (2001) examine ten critical incidents from Benjamin Franklin's life.

Following prior research (Klein & Meyers, 1999; Mumford, 2002), we pursued a multi-stage approach. We selected appropriate entrepreneurial episodes from the film, described the context in which these occur, interpreted the interrelationships between selected episodes and other parts of the film, as well as its overall context, and eventually interpreted the results beyond the original context. The interpretation and understanding of the ten selected episodes in their proper context was achieved by using a broad range of textual sources, including books and articles related to the PC industry. Our use of outside sources to understand the meaning of each scene is consistent with the notion that once a narrative has been produced as a work (i.e. textualized), it acquires a certain autonomy from its original

production, as well as from the participants involved (Thompson, 1984), thus allowing for new interpretations (Tan, Wilson, & Olver, 2009). In the words of Ricoeur (1981):

> *To interpret [...] is to appropriate here and now the intention of the text [...] the intended meaning of the text is not essentially the presumed intention of the author, the lived experience of the writer, but rather what the text means....*

Episodes and Findings

Tables 2 and 3 present a summary of ten selected entrepreneurial episodes (five of discovery and five of creation) with regards to their film context, thematic substantiation, and industry relevance. We summarize each scene individually, provide a timeline to identify its occurrence in the film, and link it with events and incidents from the film and the real world. Unless referenced otherwise, all direct quotes in this section (including Tables 2 and 3) are from the film.

We use numbers (1 to 5) to refer to specific discovery and creation scenes. For instance, "Paul Allen and Bill Gates discover the need for computer language" is referred to as discovery scene 1, and "Apple I is built" is referred to as creation scene 1.

Table 2. Discovery Episodes from the film *Pirates of Silicon Valley* (*PSV*)

Discovery Episodes			
Synopsis	Film Context	Thematic Substantiation (with regards to "discovery")	Industry Relevance (Literature Support)
Scene 1: *Paul Allen and Bill Gates discover the need for a computer language* Film timeline: 10:25-12:17	Paul Allen spots a recent issue of *Popular Electronics* magazine with a picture of the Altair 8800 computer on the cover. He shows it to Bill Gates, who realizes that the Altair lacks a programming language as "right now it just sits there and blinks."	This scene takes place fairly early on in the film. Allen and Gates are Harvard students. It is followed by Gates's specific efforts to gain direct contact with the makers of the Altair (Ed Roberts of Micro Instrumentation and Telemetry Systems) to propose the development of a computer language.	This scene shows that the initiation of discovery occurring exogenously. Paul Allen's and Bill Gates's prior knowledge and interest in computers led them to pursue an opportunity that was there for everyone to grab. Paul Allen "stumbles upon" the magazine article about the Altair in a typical Kirznerian fashion. He was not searching for it; in fact, he serendipitously comes across the article, which informs him of the Altair's development. The magazine stated that there was a demand for a suitable programming language (Day, 1994). Paul and Bill just needed to write a language to meet this demand.	The film indicates that these events take place after 1974. This can be confirmed, as the *Popular Electronics* magazine cover depicting the Altair 8800 was published in January 1975 (Karlgaard, 2006). The Altair 8800's introduction was an important chapter in the computer industry's history, as its build-it-yourself design helped make small computers available to a large consumer (i.e. non-corporate) market, which eventually led to the development of the PC industry (Hill & Deeds, 1996). It is here that Gates and Allen's interest in computers is channeled into (business) efforts for the first time (i.e., the development of a computer language).

Table 2. Discovery Episodes from the film *Pirates of Silicon Valley* (*PSV*) (continued)

Discovery Episodes			
Synopsis	Film Context	Thematic Substantiation (with regards to "discovery")	Industry Relevance (Literature Support)
Scene 2: *Steve Jobs and Steve Wozniak discover a market for personal computers* Film timeline: 18:49-20:40	Steve Jobs and Steve Wozniak present the Apple I at the Homebrew Computer Club meeting in Berkeley. They enter the venue while the Altair 8800 is being presented on stage. At the meeting, they set up their own homemade computer. The computer's design impresses the audience and makes Jobs and Wozniak the center of attention. They leave the meeting with orders for fifty computers.	This scene is preceded by scenes depicting the general struggle of both Jobs and Wozniak to find direction in life. Up to this point, they seemingly have no clear aim or intention behind their actions. The obvious success of their prototype, basically anticipating the design of personal computers to come, confirms their initial "feel" for the market and, most importantly, indicates a clear market potential. The scene is followed by Jobs sharing his ideas about future prospects of their endeavor with Wozniak.	Primarily due to their alertness, Jobs and Wozniak were able to interpret the positive response to their product as a clear indication of a market opportunity. The feedback from the audience is an exogenous factor confirming their discovery's potential value. It demonstrates that Steve Jobs and Steve Wozniak find an unmet demand for small computers among people who had previously not been considered computer buyers (Bergin, 2006; Levy, 2007). This demand was latent and not explicit, as the major computer companies of the day were apparently not aware of it, and potential customers were not asking for personal computers (Jackson, Mandeville & Potts, 2002).	The recognition of the opportunity to sell personal computers is a central event in the industry's history (Holcombe, 1999). The product they present is later referred to as the Apple I. The market success of the Apple I was due to its most distinct feature: it was a fully assembled machine with an input device and an output device.
Scene 3: *Microsoft finds DOS* Film timeline: 50:34-52:55	Microsoft needs operating software to sell to IBM. The Seattle Computer Company, an independent venture, had developed an operating system known as QDOS (Quick and Dirty Operating System). After some negotiations, Microsoft buys the QDOS for 50,000 USD.	Microsoft enters into a deal to provide the Disk Operating System (DOS), a product that, at the time, they knew they did not yet have. Microsoft adapts the QDOS to IBM's requirements and licenses to other companies. The deal is a turning point in Microsoft's development, as it enabled it to become an IMB business partner.	Microsoft realized there was a business opportunity if they could obtain an operating system someone else had actually developed without seeing its market potential. Thus, based on its prior knowledge and alertness to this gap, Microsoft discovered a significant opportunity, which essentially involved arbitrage (Loasby, 1992). As Kirzner (1973: 79) explained, an arbitrageur-entrepreneur "sells for high prices that which he can buy for low prices." The arbitrageur helps close pockets of ignorance in the market by acquiring a bundle of rights to attributes (i.e. a distinct asset) in one transaction and selling the asset in another transaction (Foss, Foss, Klein, & Klein, 2007).	The episode supposedly takes place in 1980, after Steve Ballmer had joined Microsoft and when IBM required an operating system for its microcomputers (Jackson, Mandeville, & Potts, 2002). Not having developed anything close to what IBM was asking them for, they acquired what was known as QDOS (Wallace, 1993).

(continues)

Table 2. Discovery Episodes from the film *Pirates of Silicon Valley* (*PSV*) (continued)

Discovery Episodes			
Synopsis	Film Context	Thematic Substantiation (with regards to "discovery")	Industry Relevance (Literature Support)
Scene 4: *Apple discovers WIMP* Film timeline: 1:00:51-1:03:53	A team from Apple visits the Xerox Palo Alto Research Center. Apple has learned that Xerox has been developing new, advanced technological applications such as the computer mouse and graphical user interface. Xerox corporate office does not consider these innovations relevant to their business, so they allow Apple to study them in detail. The technological development at Xerox surprises the Apple team, which proceeds to adapt these innovations for their own purposes.	This scene follows Steve Jobs echoing Picasso's famous words: "Good artists copy. Great artists steal." Jobs makes this idea the guiding philosophy by which Apple conducted its business. Viewer attention is then drawn to Xerox's innovations. The scene is followed by a voice-over from Wozniak concluding that with "about 100 billion USD head-start on anyone else, Apple was making tons of money."	Apple clearly realized the huge potential of these inventions and their impact on personal computers' design and capabilities, while the top management at Xerox did not see much potential in these products (Holcombe, 1999; Shane, 2000). Based on their prior knowledge of and experience in the computer industry, Apple realized that there was an opportunity to obtain these technologies from Xerox. As Shane (2000) notes, prior knowledge "from work experience, education, or other means, influences the entrepreneur's ability to comprehend, extrapolate, interpret, and apply new information in ways that those lacking that prior information cannot replicate."	This scene supposedly takes place in December 1979, when Xerox indeed granted Apple three days' access to familiarize themselves with their Palo Alto Research Center (Levy, 1994; Wozniak & Smith, 2006). Although Xerox received pre-IPO shares from Apple for this privilege, the technological advantage Xerox was giving away here was significant. In Levy's words (1994: 77-78), "the number crunchers at Xerox considered this a fairly innocuous concession—they were getting a tangible stock deal in exchange for allowing Apple a brief exposure to technology that in their minds belonged more to science fiction than to future revenues." It ultimately led to the development of the Apple Lisa with a graphical user interface (Wozniak & Smith, 2006).
Scene 5: *Gates discovers the graphical user interface* Film timeline: 1:04:54-1:07:21	When Bill Gates discovers the graphical user interface, he becomes concerned about Apple's technological head start. He is eager to join forces with Apple. He is able to convince the initially indifferent Jobs to trust him (personally) and to provide him with prototypes of the Macintosh long before its introduction to the market.	In the film, this specific scene starts by showing Bill Gates trying an Apple computer in his office. Having met with Steve Jobs, directly after leaving the building, Gates mentions to Ballmer "if he [Jobs] is not careful, he is going to wreck the place," thus making no secret of his plans to copy Apple's innovations for himself. This scene recalls Apple adapting Xerox's innovations (Scene 4), with the major difference that Jobs is not aware of Gates's plans.	Gates becomes aware that Apple, with its progressive corporate culture and technological lead, is the real competitor in the market. At a time when Jobs still perceived IBM as the major threat, Microsoft and Apple have actually become direct rivals. This opens the opportunity for Gates to gain Jobs's trust and to adapt their innovations before Jobs realizes what is happening. Alertness to opportunities and knowledge of market potential are the basis of Gates's discovery.	This scene presumably takes place in 1983 (Wozniak & Smith, 2006; Simmons, 2007). It depicts an important moment in the development of the relationship between Apple and Microsoft, as well as between Jobs and Gates, because it lays the foundation of the direct competition between the two companies, which continues to this day (Wallace, 1993). Notably, at this time, Bill Gates was not actively searching for new technologies for operating software. Microsoft had already gained a reputation in operating systems and programming languages (Rivlin, 1999). When Gates saw the graphical user interface developed at Apple, he "knew [it] portended the future" (Levy, 1994: 161). Microsoft then zealously turned its attention to working on this new software, which formed the basis of its now ubiquitous Windows product (Holcombe, 2003).

Table 3. Creation Episodes from the film *Pirates of Silicon Valley* (*PSV*)

Creation Episodes			
Synopsis	Film Context	Thematic Substantiation (with regards to "creation")	Industry Relevance (Literature Support)
Scene 1: *Apple I is built* Film Timeline: 16:09–18:02	Wozniak and Jobs, university students at the time, are at the kitchen table, chatting and working on constructing a computer (which later came to be called the Apple I). From their conversation, it becomes apparent that, so far, also with regard to the computer on which they are working, they have no clear goal, not to mention business intentions.	The actual scene does not depict the specific procedure by which the computer is built. Yet, the characters' comments and work make it clear that they are building a computer. For example, a reporter from the *Mercury News* wants to interview Wozniak when he learns that they are building a computer "all from spare parts."	The construction of the Apple I computer was not based on an existing design; instead, it involved imagination, tinkering, and trial and error, with several setbacks along the way (see Table 1). According to Levi-Strauss (1967), entrepreneurship often involves making do with "whatever is at hand." The conscious and willful tendency to make do also involves combining and re-using existing resources to put them to unexpected uses, sometimes resulting in "brilliant unforeseen results" (Baker & Nelson, 2005). The willingness to make do and engage in resource recombination facilitated the construction of the Apple I by two young men with very limited resources and no existing blueprint to follow in terms of what a computer should look like.	From the film, no clear deduction can be made regarding the period during which the construction of the Apple I took place. But there can be little doubt that design was a milestone in the development of the PC industry (Moritz, 1984). The homemade computer was built from parts that were readily available; yet, the finished product turned out to be the first personal computer that provided a realistic marketing opportunity (Wozniak & Smith, 2006). The Apple I's significance also lies in it serving as a model for future generations of computers, as subsequent computers were expected to have a keyboard to enter information and a monitor to display output.
Scene 2: *Apple is founded in a garage* Movie Timeline: 20:40–23:04	Jobs and Wozniak start to build their computers in Jobs's parents' garage. They have little funds. It is also not clear at this point whether Hewlett-Packard (HP) actually has ownership of Wozniak's computer design, as he works for them, and has signed a contract. When HP management scoffs at the idea of computers for everyday use, Steve Jobs and Wozniak start their company, calling it Apple Computers.	This scene follows the successful presentation of the Apple I at the Homebrew Computer Club in 1976. The interest they saw among people for their design convinced Jobs and Wozniak to go ahead and build computers in larger numbers to sell to individual customers. The scene is followed by another scene, which shows Steve Jobs trying to secure a bank loan to finance the business's initial expansion, a task at which he is not successful at first.	The formation of a new organization is arguably the most important aspect of entrepreneurial activity (Gartner, 1990). Apple was founded when PCs were an untested idea, and it was not clear why "ordinary people would want computers." Starting the company under such circumstances involved imaginative entrepreneurs' intentionality (to sell computers), acquisition of resources (e.g., obtaining credit from suppliers), taking an organizational identity (the name Apple Computers), and transacting with customers as a business (Katz & Gartner, 1988).	Organizing disparate business activities and selling computers into a formal business was obviously key to Apple's commercial success (Wozniak & Smith, 2006). If the various activities had not been organized into a business, it would have been impossible to create the necessary momentum and legitimacy for the new venture. As the Wozniak character explains in the film, this was a time when "business guys and bankers thought you had just barfed on their shoes if you tried to interest them into computers for ordinary people." Apple soon becomes the world's leading personal computer company (Levy, 1994), and in less than five years after its founding, Apple enters the Fortune 500 list.

Table 3. Creation Episodes from the film *Pirates of Silicon Valley* (*PSV*) (continued)

Creation Episodes			
Synopsis	Film Context	Thematic Substantiation (with regards to "creation")	Industry Relevance (Literature Support)
Scene 3: *Creation of the software business* Movie Timeline: 48:02-50:30	Bill Gates, Paul Allen, and Steve Ballmer visit IBM headquarters. They offer to license IBM an operating system for their new line of computers to compete with Apple. IBM finds their suggestion "no big deal"- "the profits are in the computers themselves, not this software stuff" is how an IBM manager put it.	At the time that Microsoft dares to propose this deal to IBM, the company has had only limited market success. In the words of Steve Ballmer, at this stage, the company is still a "two-bit little outfit." From this vulnerable position, they sought to create a new business, in which Microsoft would retain ownership of the software and customers would only obtained usage rights.	Microsoft succeeded in carving out an entirely new software business market in an era when the established wisdom was that the profitable side of computers is hardware, not software. This required imagination and conjecture based on future expectations. We consider Microsoft's exploitation of a perceived opportunity in software as an entrepreneurial creation episode, as it led to the unforeseen emergence of an entirely new industry. By choosing to walk an unbeaten path, Microsoft was taking a massive risk (Aldrich & Fiol, 1994).	Around 1980, IBM decided to take on the challenge Apple presented in the PC market. It required an operating system for its machines (Jackson, Mandeville, & Potts, 2002). Microsoft saw the opportunity and the market value in the software, as opposed to the IBM's emphasis on the hardware. Within four years of the "breakthrough deal" with IBM, *TIME* magazine featured the 28-year-old Bill Gates on its cover, calling software "the magic carpet to the future" and the "soul of the [computer] machine" (Taylor, Moritz, & Stoler, 1984).
Scene 4: *Xerox invents the mouse and GUI* Film Timeline: 1:01:04-1:01:48	In the words of a Xerox executive, "We created the mouse and all the rest of it…" (1:02:30).	This scene is presented in the film after Wozniak has shared that "Xerox was secretly developing all this amazing stuff like the mouse and the graphics on the screen, instead of a bunch of numbers." It is followed by Wozniak comparing the development at Xerox to a Rembrandt, worth about "a hundred billion dollars."	The mouse invented at Xerox was a palm-sized contraption that contained a metal ball pressed against two rollers to track movement and send digital positional information directly to the computer. Although it was not the first mouse invented (the credit for that goes to Doug Engelbart at Stanford Research Institute) (Levy, 1994), it provided the predominant model for use in PC for years to come. We consider Xerox's invention of the mouse as a creation episode, because it clearly illustrates imagination translated into reality through action based on future expectations.	It is not possible to assign an accurate date or even timeframe to this innovation process. However, the impact that the development of the computer mouse and graphical user interface has generated for everyday computing today is significant: Both tools are key interfaces for modern information technology. Furthermore, with regards to this film, and related industry relevance, subsequent work at Apple and developments in the computer industry substantially built on the mouse and the GUI (Wozniak & Smith, 2006).
Scene 5: *Apple creates the Macintosh* Movie Timeline: 1:07:21-1:10:16	This scene presents Steve Jobs as saying: "Let me show you the future… the ultimate, insanely great, fusion of art and science… It's called the Macintosh."	This scene is preceded by the depiction of Apple as a company that proudly displayed its pirate paraphernalia, and where employees were expected to work 90-hour weeks on a regular basis. It is followed by Wozniak recounting that, at this time, "Apple was tearing itself to pieces… the Macintosh group against everyone else in the company."	It becomes clear from the film that the team, led by Steve Jobs, has created a game-changer through their actions, based on their vision of the future, and using their imagination. The Macintosh's long-term impact on future designs demonstrates its disequilibrating effect on the industry as a whole.	The Macintosh was hailed by fans as the "most revolutionary introduction in the history of personal computing." Although it was fourth in the Apple series of computers (preceded by Apple I, II, and Lisa), it was widely regarded as "the computer that changed everything."

As explained earlier, these scenes were selected for their potential to illustrate either discovery or creation, and demonstrated high inter-coder reliability when they were classified into discovery or creation categories. Tables 2 and 3 provide more context, which is an important result of our analysis, as the following is only summarized descriptions of our findings.

In discovery scene 1, Paul Allen spots the Altair 8800 computer developed by Micro Instrumentation and Telemetry Systems (MITS) on the cover of the "Popular Electronics" magazine, which he brings to Bill Gates's attention. This appears to be a classic example of entrepreneurial alertness as Allen "stumbles upon" the opportunity that exists "out there" through an exogenous event (Kirzner, 1997). Yet, when related scenes, as well as the overall film context are taken into consideration, it becomes obvious that simply finding the Altair 8800 on a magazine cover was not enough. It took Gates and Allen's proactive action to convince Ed Roberts of their offer to provide a programming language for the Altair, which facilitated their entry into the industry and the start of Microsoft. As Gates (2010) recounted recently, "Ed [took] a chance on us—two young guys interested in computers—and [when] our first untested software worked on his Altair [it] was the start of a lot of great things."

In discovery scene 2, Jobs and Wozniak arrive at a meeting of the Homebrew Computer Club at Stanford. The club was "where a bunch of guys spent all their spare time trying to …show the stuff they built, except that most of it didn't really work all that well." They use the meeting to present their prototype of a personal computer, which results in sales to the club members. We categorize the recognition of the opportunity to sell personal computers as a discovery episode because Jobs and Wozniak find an unmet demand for small computers among common people, who had not been considered by large corporations as serious buyers earlier.

However, from creation scenes 1 and 2 it becomes obvious that the demand only surfaced after they had presented a working prototype of the computer they had built. We consider the building of the computer a creation episode (creation scene 1 in Table 3), although the movie tells us little about the detailed action taken to create the computer. The scene is rather implicitly presented but clearly indicates path-dependent behavior enacted by the two leading individuals behind Apple. Discovery scene 2 is preceded by creation scene 1 and followed by creation scene 2 when "Apple Computers" is started in a garage. More explicitly, creation scene 2 describes Apple's humble start with

limited finances and unclear ownership structure. While this clearly outlines evolutionary behavior under uncertainty driven by the actors' imagination, it also foreshadows a disequilibrating outcome (see Table 1).

In discovery scene 3, Microsoft is asked to provide an operating system—foundation software that allocates storage and schedules tasks in a computer—for a new line of IBM personal computers. Microsoft finds that the Seattle Computer Company has developed an operating system known as QDOS (Quick and Dirty Operating System). Without disclosing its intention to re-sell the QDOS to IBM, Microsoft buys it from the Seattle Computer Company for $50,000. Microsoft then adapts QDOS for use by IBM. We categorize this episode as discovery because it essentially involves arbitrage (Loasby, 1992). Such transactions comprise both demand and supply (Sarasvathy, Dew, Velamuri, & Venkataraman, 2003). As is seen in this episode, there is both demand for and supply of disk operation system (DOS). Microsoft's role was to buy at a low price and sell at a high price, with the profit as the reward for this arbitrage.

In creation scene 3, rather than sell the software outright to IBM as discovery theories predict, Microsoft negotiates the right to retain the ownership of the software. In effect, IBM obtained a license for the software from Microsoft, which was then free to also sell it to other computer manufacturers. We consider this a creation episode because at the time IBM believed that "the money is in hardware," while Microsoft expected software to become important. Microsoft's decision, which was based on certain expectations of the future, led to the unforeseen emergence of an entirely new industry. The deal between Microsoft and IBM can be readily traced to IBM being in dire need of an operating system and the Seattle Computer Company's development of the disc operating system, which Microsoft bought.

In discovery scene 4, a team from Apple visits Xerox's Palo Alto Research Center (PARC) for a preview of their latest research. The Apple team is shown the new technologies PARC is developing—windows, icons, a menu, and a pointing device (WIMP). These technological wonders amaze the Apple team, who ask probing questions about the different tools. By the end of the visit, the Apple team has "about a hundred billion dollar head-start over everyone else" in the computer business. We categorize this episode as discovery because it involves the Apple team seeing different value in the WIMP tools than the Xerox corporate managers, who had already been briefed on the technological developments in their research laboratory (Shane, 2000).

Nevertheless, creation scene 4 clarifies that this discovery would not have occurred had Xerox not invented the WIMP technology in the first place. At the time of its development at Xerox, WIMP's usefulness was unclear and it seemed to belong "more to science fiction than to future revenues" (Levy, 1994: 78). In short time, the Xerox preview proved to be the "bedrock" on which the computer industry was constructed; a future in which Apple went on to become a leading player, while Xerox was relegated to a footnote.

In discovery scene 5, Microsoft learns that Apple is incorporating GUI into their computers, which is radically ahead of the command-line system in which Microsoft had been investing (Levy, 1994). Microsoft recognizes the usefulness of GUI and decides to incorporate the user interface in the now ubiquitous Windows product (Holcombe, 2003). We consider this a discovery episode as it involved Microsoft recognizing the potential value of a system that was already being developed by Apple. At this time, Microsoft was not actively searching for new technologies to use in their operating software, as the company had already gained somewhat of a reputation for its existing product line.

Nonetheless, in relation to creation scene 5, one can see that Microsoft made a radical about-turn regarding the technology underlying its earlier software. It "just copied the Mac" in giving the new Windows software its look and feel (Jobs, 2005). We associate the Macintosh computer's construction with creation because it redefined the trajectory of the computer industry, setting the whole industry on a new path. According to Chan (2004), the Macintosh was "the most revolutionary introduction in the history of personal computing." The features that made the Macintosh "insanely great" were not, however, incorporated in response to consumer demands or market feedback, but reflected Apple's proactive initiative to "transform the world" and "put a dent in the Universe" (Levy, 1994: 6).

In the next section, we discuss various implications of the findings reported here. Although these findings are derived from an analysis of a specific industry context (i.e. the PC industry), we believe they have broader implications for entrepreneurship theory and practice, a topic to which we now turn our attention.

Discussion

The formative phase of a new industry is, in Utterback and Suarez's words (1993: 17), "predominantly entrepreneurial," making it worthy of closer study to understand entrepreneurial behavior. Our research using a novel qualitative method- revealed three key unanticipated findings. First, we found that that discovery and creation are fundamentally interrelated. Second, at least, during industry emergence, discovery and creation behaviors share a common element: bricolage. Third, we also found that ideological activism is a major component of entrepreneurial behavior in a new industry's formative years, as entrepreneurs seek to convince others of the value of their offerings and evangelize them into a new industry. We discuss each of these major findings of our study in greater detail below.

Implications for Theory

Our findings about the nature of entrepreneurial activity during industry emergence have important implications for theory development in entrepreneurship.

We find evidence of ideologically motivated behavior's role in discovery and creation in the emergent PC industry. We believe our finding is doubly informative. First, it reveals that during industry emergence, both discovery and creation activities involve enterprising actors engaging in evangelical efforts to make the new offering comprehensible and acceptable to others. The role of evangelism- or ideological activism- rather than economic maximization, has been previously recognized in the successful emergence of new industries such as automobiles (Rao, 2004) and wind energy (Sine & Lee, 2009). However, these studies attribute evangelical efforts mostly to third-party organizations such as consumer clubs and social organizations (Lee, Sine, & Tolbert, 2011). Our research reveals that enterprising actors occupy a vanguard position in advocacy efforts with ideological—rather than economic—motivation driving them to engage in entrepreneurial behavior. To our knowledge, such evangelism has not received any attention in the discovery and creation literature, which we hope will begin to be redressed as a consequence of our findings. Second, our conception of evangelism is consistent with the previously recognized influence of so-called champions who "energize efforts toward collective action and devise strategies… to create entirely new industries and associated institutions" which is at the heart of the growing institutional entrepreneurship literature (Garud, Jain, & Kumaraswamy, 2002: 197-8). Notably, our findings extend this understanding of championing behavior in a new direction: Where evangelists have traditionally been believed to occupy "positions associated with the highest degrees of legitimacy," our research shows that activism is a key aspect of emerging industries even when the champions engaging in evangelizing efforts are themselves striving to gain legitimacy (Maguire, Hardy, & Lawrence, 2004: 667).

We also found that bricolage comprised a major part of both discovery and creation. This is a novel finding because bricolage has traditionally been associated only with creation approaches (Garud & Karnoe, 2003). As the film reveals, bricolage helped nascent entrepreneurs—at Apple and Microsoft—counter their resource deficit by combining the resources around them. For example, the building of Apple I computer involved recombining readily available parts, and the founding of Apple involved obtaining parts on credit from a supplier and converting Jobs' parents' garage into a production floor and an office. Particularly interesting in the *PSV* context is that in the new industry's very early days, bricolage was dominant, while formulaic agency occurred much later (after venture creation) (Katz & Gartner, 1988). Furthermore, we find evidence that bricolage also plays an important role in the discovery perspective. Contrary to the notion that discovery involves simply fulfilling predetermined resource requirements (Edelman & Yli-Renko, 2010), we find evidence of bricolage in several discovery episodes, such as the discovery of a market for personal computers and Microsoft's discovery of DOS. Specifically, these episodes involve "network bricolage": the use of pre-existing contact networks to achieve objectives and goals (Baker, 2007). Research on bricolage only began in earnest in recent years. Based on our findings, we call for further research to gain a deeper understanding of bricolage's role in both discovery and creation.

Finally, our research reveals that discovery and creation behaviors are fundamentally interrelated, rather than simply competing (Edelman & Yli-Renko, 2010) or complementary (Zahra, 2008). Creation behaviors generate new artifacts that enterprising actors discover over time yield more new artifacts, which become the basis for future creative endeavors. The intersection of discovery and creation thus moves the entrepreneurial process forward. We therefore suggest that, rather than polarize entrepreneurial phenomena by theorizing, researchers need to encompass both discovery and creation to build "constructs that accommodate contradictions" (Lewis, 2000: 773). Consideration of the interactive nature of discovery and creation may not find favor with either discovery or creation purists who tend to be dismissive of those on the other side of aisle. Yet, our findings suggest that comprehensive understanding of industry emergence requires combining insights from both perspectives. In a similar vein, Evans and Doz (1992) argue that the duality concept offers a new provocative framework for exploring complex phenomena such as entrepreneurship. Within a duality framework, researchers and scholars can explore questions related to the kinds of tensions that exist between discovery and creation, why the two might trigger reinforcing cycles, and how entrepreneurial agents can navigate through the two as catalysts for ongoing entrepreneurial behaviors (Graetz & Smith, 2007). Thus, based on the findings of our study, future research would do well to consider the interactive nature of creation and discovery from the outset.

Implications for Practice

Our research also has certain implications for entrepreneurs. First, there is growing interest worldwide in practically relevant entrepreneurship research (Busenitz et al., 2003; Corner and Pavlovich, 2007). Entrepreneurship researchers are often encouraged to use entrepreneurship practice to inform their research; consequently, practice shapes research from the very onset. DeTienne and Chandler (2004) note that studying real-world entrepreneurial activity, focusing specifically on issues related to actions and processes, will make entrepreneurship research more engaging. Corley and Gioia (2011) argue that researchers in management schools should conduct studies that provide business insights derived from real-world observations. This may specifically apply to entrepreneurship researchers, who are often called to and tasked with enhancing entrepreneurial activity in society. By seeking to understand behaviors of some of the most enterprising actors during one of the most entrepreneurial periods in recent US history, our research engages closely with entrepreneurship in a real-world context.

Second, prior research and anecdotal evidence indicate that nascent entrepreneurs are often advised to not disclose information about their activities to others. However, we find that even when entrepreneurs share their ideas and clearly describe what they are considering, others may not appreciate its potential. For example, Steve Wozniak was required to tell Hewlett Packard's (HP) management about his work on the new computer, but HP saw no future in activities related to designing and making a computer for individual use. Similarly, even when Microsoft informed IBM managers that it wanted to be able to sell the operating system to other firms, IBM failed to realize that software could actually be a profitable business. These corporate managers' prior knowledge, which was based on their work experience, industry exposure, and education, prevented them from recognizing the value of these new endeavors. In other words, managers' existing knowledge corridors adversely affected their ability to evaluate new business initiatives with an open mind. It would thus be incorrect to assume that everyone is equally and instantly capable of exploiting an opportunity once it is presented to them (Endres & Woods, 2006). It seems that the secret to engaging in entre-

preneurial behavior does not lie in information about new opportunities, but in making sense about them–what Garud and Karnoe (2003) refer to as "interpretive asymmetries" (Garud & Karnoe, 2003).

Finally, films may be particularly well-suited for entertainment education (Singhal & Rogers, 2002) in entrepreneurship, as millions of viewers watch entrepreneurship-related films—for example, *The Social Network* (2010) and *Risky Business* (1983). While most people probably watch these films for entertainment, prior studies have shown that people are also impacted by the entrepreneurship-related information depicted in them (Bumpus, 2005; Champoux, 1999). In addition, according to the drench hypothesis (Greenberg, 1988), noteworthy or striking examples presented in films (e.g., Bill Gates and Steve Jobs in *PSV*) can have a significant influence on viewer attitudes and perceptions. Social cognitive theory (e.g., Bandura, 1986) suggests that audience members can vicariously learn norms and behaviors from films, as people are far more likely to mimic a behavior they have seen rather than one that has been recommended but not demonstrated. Seeing someone who—like them—starts out small and overcomes tremendous obstacles to succeed in the face of adversity is likely to enhance students' beliefs in their abilities—or self-efficacy—with regard to entrepreneurial behavior.

Limitations

Notwithstanding our interesting findings, our study has certain limitations that suggest avenues for further research. First, our study uses data derived from a film officially based on the book titled *Fire in the Valley: The Making of the Personal Computer* by Paul Freiberger and Michael Swaine. It is possible that looking at the PC industry through a different worldview would uncover some different entrepreneurial behaviors not covered in the *PSV*—the "Rashomon effect," which posits that people see and describe reality based on their unique filters (Mittelmeier & Friedman, 1991). Future research may use other texts about the PC industry's emergence, such as *Accidental Empires* (Cringley, 1992), or the 1996 PBS documentary derivative *Triumph of the Nerds* to further generate additional insights into entrepreneurial behavior.

Second, following prior research, we treated the two theoretical perspectives—discovery and creation—as distinct. Consequently, we did not consider the possibility of interaction between the two theories in our interpretation of the *PSV* episodes. It is possible that had we focused from the outset on the intersection between discovery and creation, we would have identified novel findings that were not uncovered by our current approach. Future research

should consider the implications of interactions between discovery and creation as we found in our study.

Finally, our study is situated in the context of a technology-based industry. The extent to which the findings revealed here will generalize to other industries (e.g., non-technology industries such as management consulting) cannot simply be assumed, but needs to be carefully examined. Relatedly, the applicability of the theory used here and the findings obtained is limited to the United States. Whether our theoretical insights and empirical results hold promise for understanding industry emergence in other countries is a topic for future research.

Conclusion

This study was undertaken to explore and apply discovery and creation perspectives to the study of entrepreneurial behavior in an emerging industry. While prior research has done a masterful job of articulating the two perspectives (Alvarez & Barney, 2007), our study addresses the next critical step in advancing this research stream: Extending discovery and creation approaches to generate insights into an important area that is in need of theoretical elaboration and empirical examination: entrepreneurial behavior during industry emergence (Bird & Schjoedt, 2009). Although the use of entrepreneurial stories as text for qualitative entrepreneurship research has begun to gain traction in the literature (Gartner, 2007, 2010b), our study goes one step further and conducts a textual analysis of a film. Given the complexities associated with gaining access to historical data about industry emergence, qualitative research that analyzes texts (e.g., books, films, and magazines) may provide researchers with a unique window into what happened during a new industry's early years (Mezias & Kuperman, 2001). Thus, our research advances knowledge about entrepreneurial behavior by capitalizing on well-regarded theoretical perspectives (Okhuysen & Bonardi, 2011) and using an innovative methodology (Corner & Paclovich, 2007) to better understand the complex and dynamic phenomenon of entrepreneurial behavior during industry emergence (Gartner, 2007).

We encourage future research to extend the knowledge frontier by studying industry emergence in other industrial and national contexts, using process-theoretic methods such as the one presented here and variance-theoretic methods that are more common in entrepreneurship research. Entrepreneurial behavior in emergent industries is an important research topic, one that merits further research attention using different methodological approaches.

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